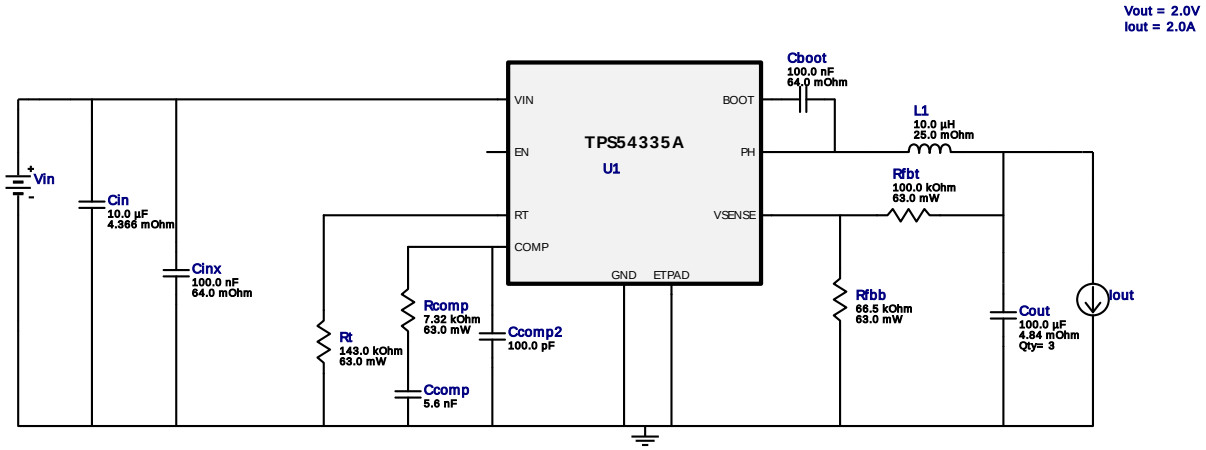
WEBENCH® Design Report

VinMin = 10.9V
VinMax = 22.0V
Vout = 2.0V
Iout = 2.0A

Device = TPS54335ADDAR
Topology = Buck
Created = 16-8-28 19:53:21
BOM Cost = $1.78
BOM Count = 14
Total Pd = 0.97W

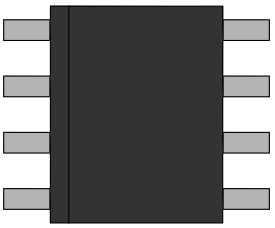
Design : 4765113/18 TPS54335ADDAR
TPS54335ADDAR 10.9V-22.0V to 2.00V @ 2.0A



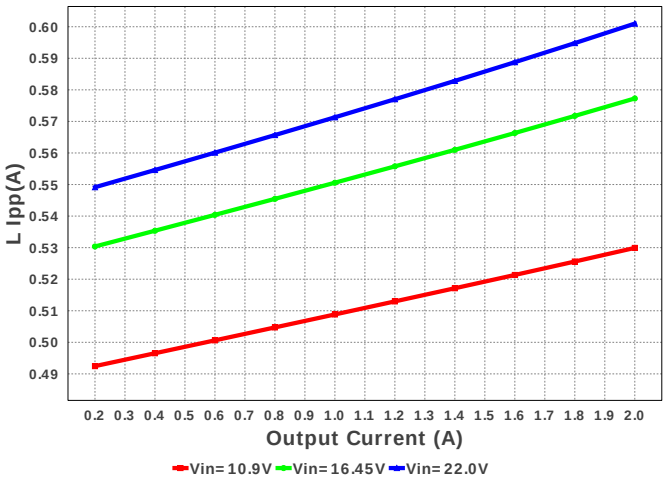
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
2.	Ccomp	Yageo America	CC0805KRX7R9BB562 Series= X7R	Cap= 5.6 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Ccomp2	Yageo America	CC0805JRNPO9BN101 Series= C0G/NP0	Cap= 100.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Cin	MuRata	GRM31CR71E106KA12L Series= X7R	Cap= 10.0 uF ESR= 4.366 mOhm VDC= 25.0 V IRMS= 2.8022 A	1	$0.05	1206_190 11 mm²
5.	Cinx	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
6.	Cout	MuRata	GRM31CD80G107ME39L Series= X6T	Cap= 100.0 uF ESR= 4.84 mOhm VDC= 4.0 V IRMS= 4.3381 A	3	$0.14	1206_190 11 mm²
7.	L1	Bourns	SRU1038-100Y	L= 10.0 µH DCR= 25.0 mOhm	1	$0.33	SRU1038 144 mm²
8.	Rcomp	Vishay-Dale	CRCW04027K32FKED Series= CRCW..e3	Res= 7.32 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfbb	Vishay-Dale	CRCW040266K5FKED Series= CRCW..e3	Res= 66.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfbt	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

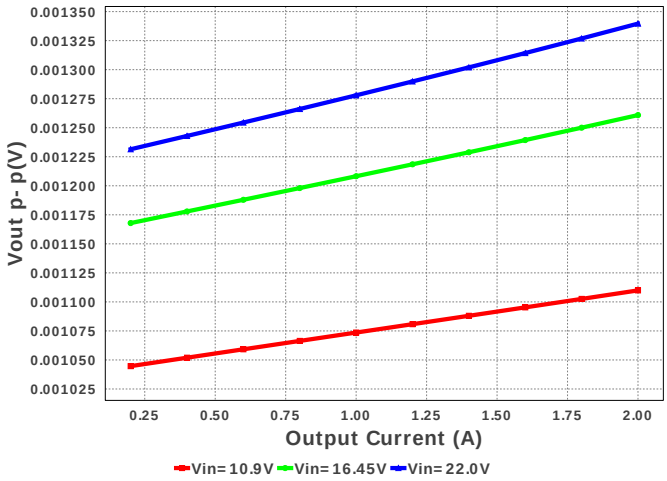
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rt	Vishay-Dale	CRCW0402143KFKED Series= CRCW..e3	Res= 143.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	U1	Texas Instruments	TPS54335ADDAR	Switcher	1	$0.90	R-PDSO-G8 55 mm^2



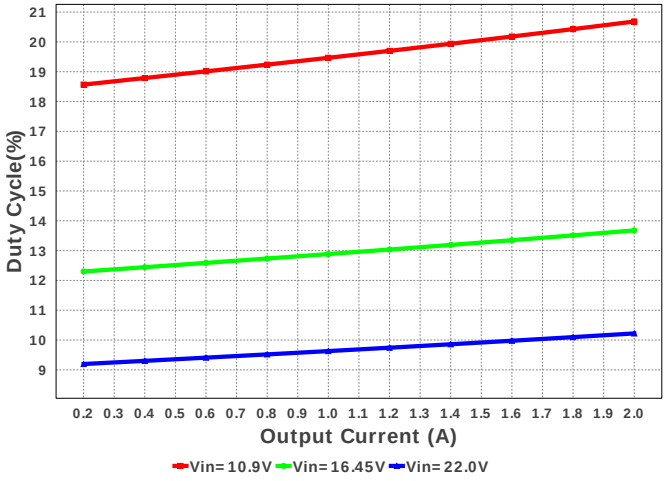
L Ipp



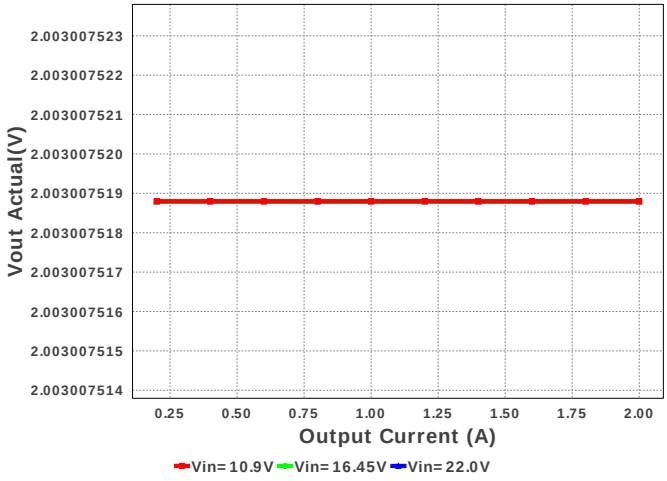
Vout p- p

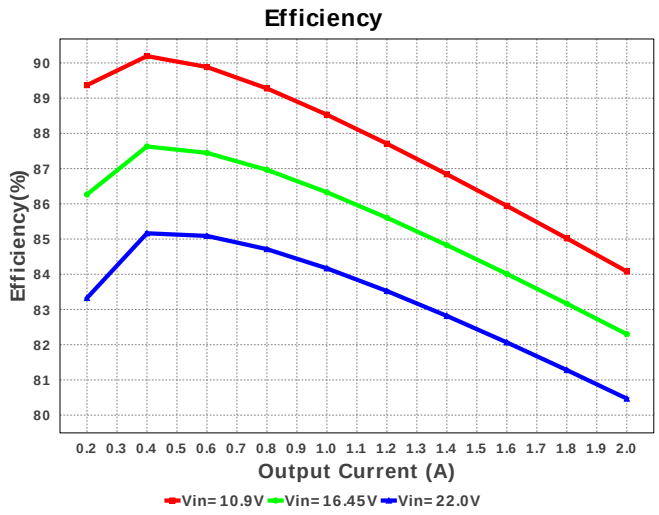


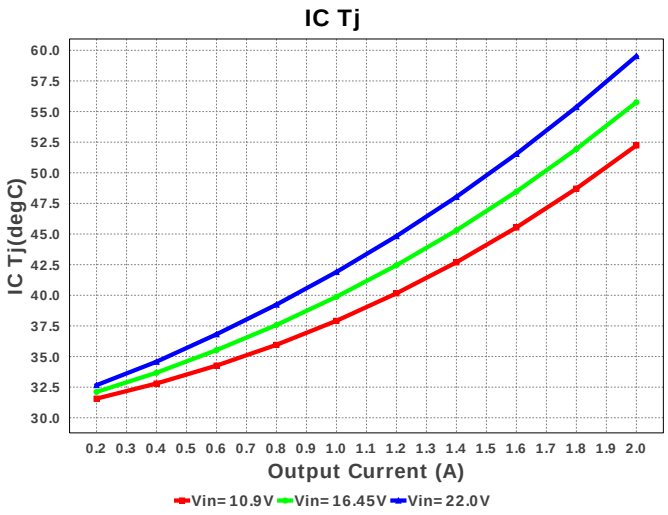
Duty Cycle

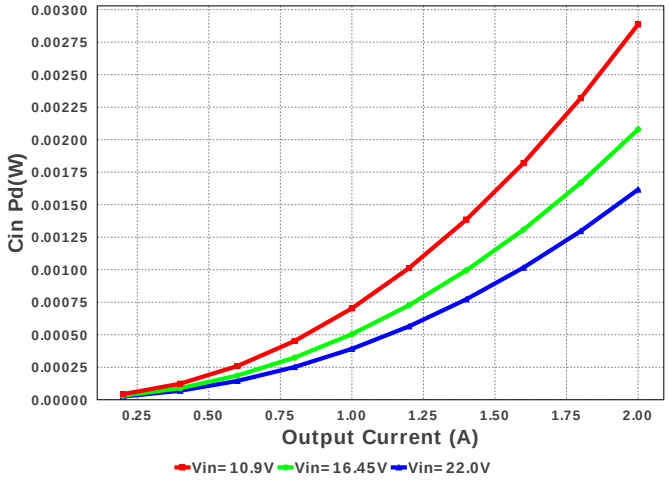


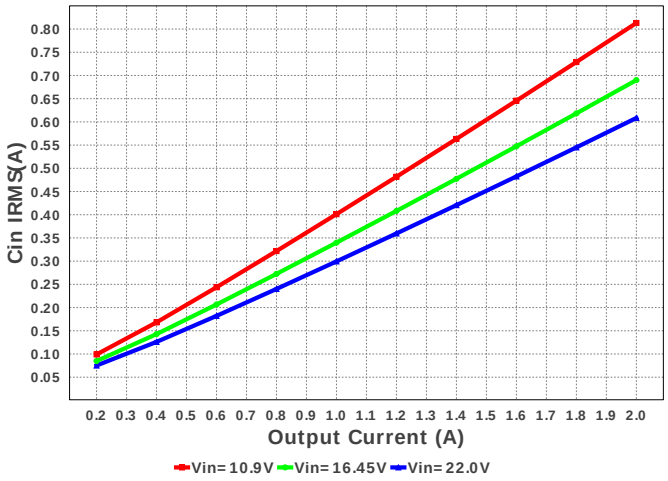
Vout Actual

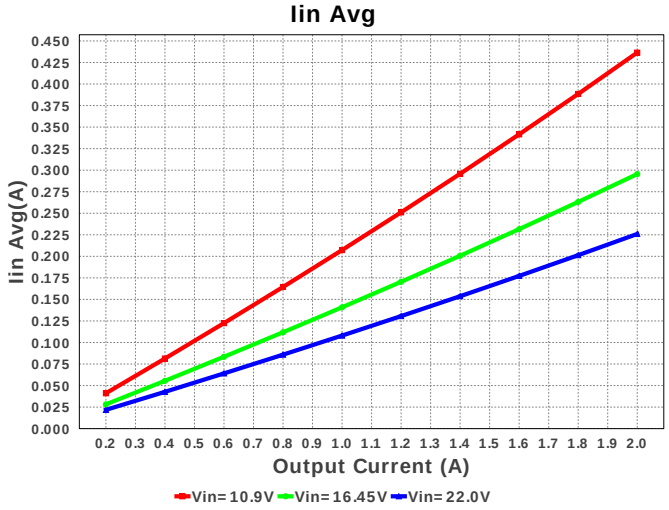


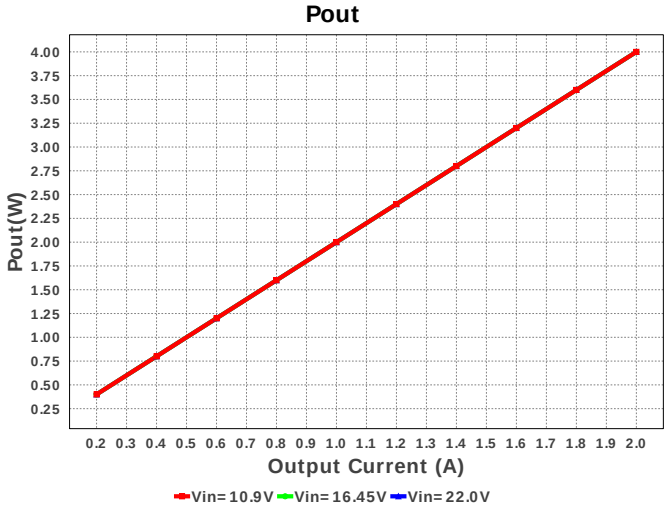


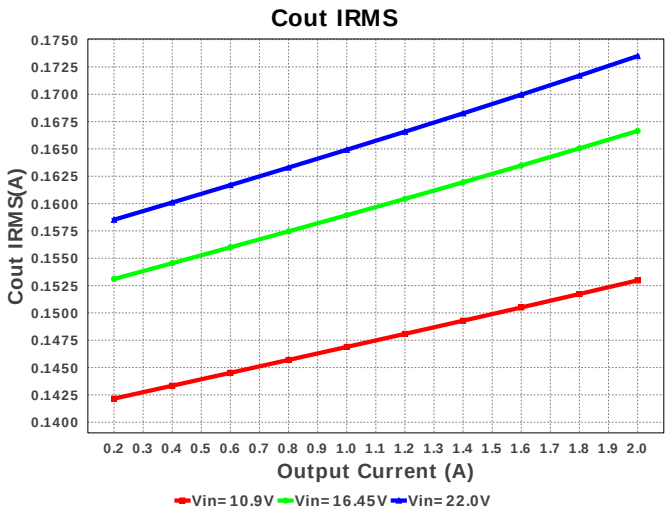


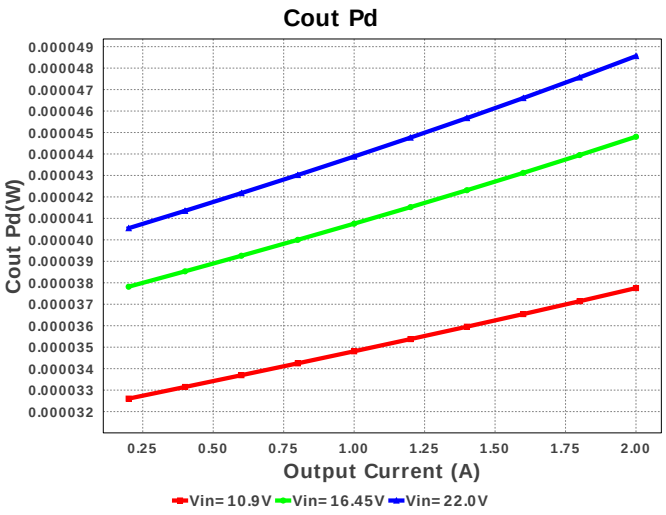


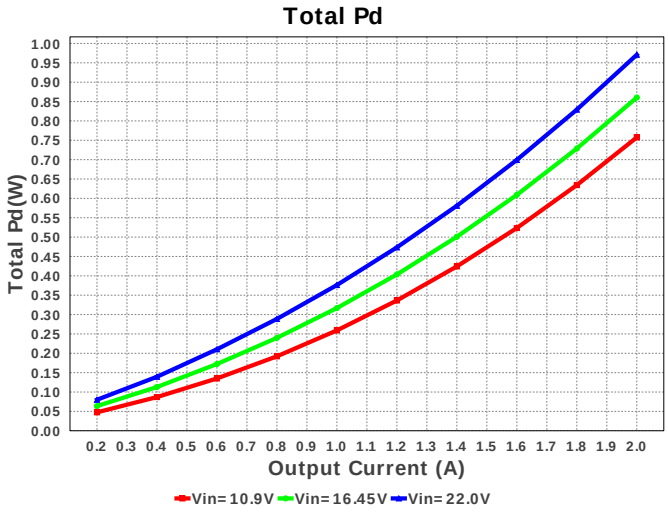


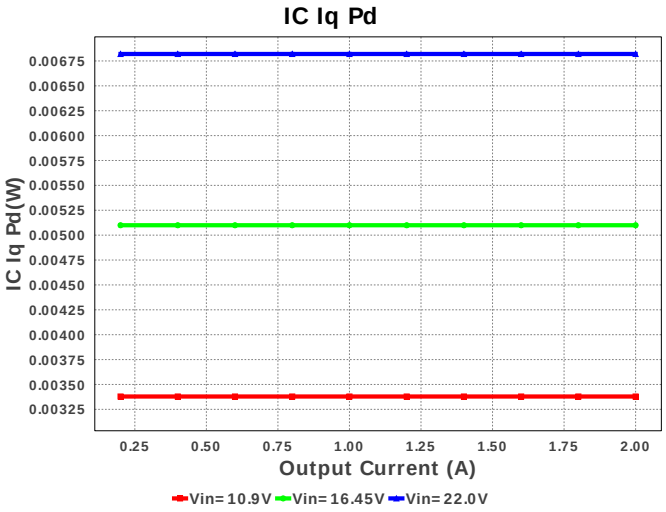


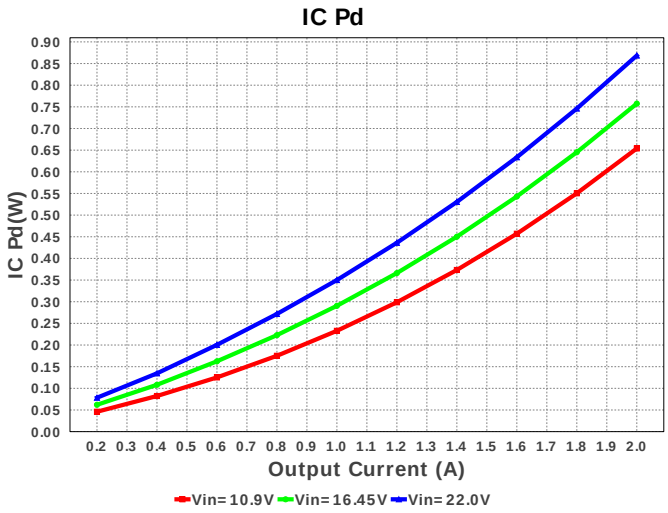


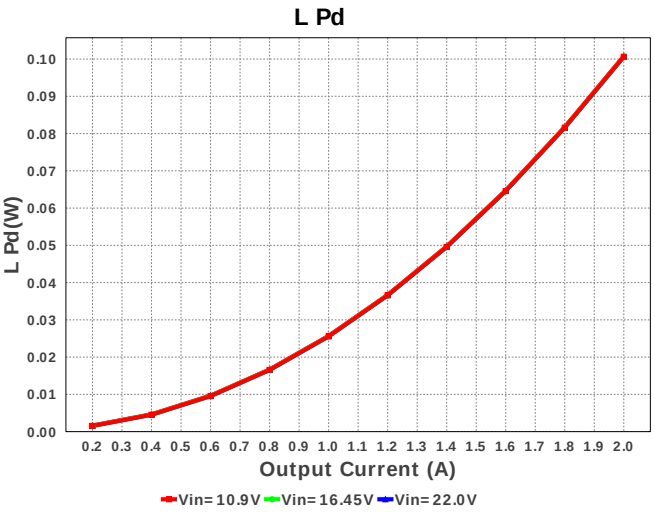


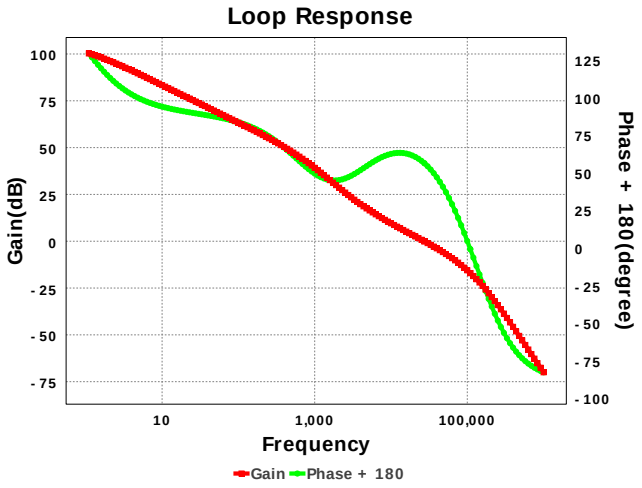












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	608.412 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	173.49 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	225.95 mA	Current	Average input current
4.	L Ipp	600.99 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	14	General	Total Design BOM count
6.	FootPrint	282.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	334.388 kHz	General	Switching frequency
8.	IC Tolerance	12.0 mV	General	IC Feedback Tolerance
9.	Mode	CCM	General	Conduction Mode
10.	Pout	4.0 W	General	Total output power
11.	Total BOM	$1.78	General	Total BOM Cost
12.	ICThetaJA Effective	34.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
13.	Low Freq Gain	100.291 dB	Op_Point	Gain at 10Hz
14.	Vout Actual	2.003 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Vout OP	2.0 V	Op_Point	Operational Output Voltage
16.	Cross Freq	27.242 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	10.222 %	Op_point	Duty cycle
18.	Efficiency	80.469 %	Op_point	Steady state efficiency
19.	Gain Marg	-16.985 dB	Op_point	Bode Plot Gain Margin
20.	IC Tj	59.527 degC	Op_point	IC junction temperature
21.	IOUT_OP	2.0 A	Op_point	Iout operating point
22.	Phase Marg	57.124 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	22.0 V	Op_point	Vin operating point
24.	Vout p-p	1.34 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	1.616 mW	Power	Input capacitor power dissipation
26.	Cout Pd	48.559 µW	Power	Output capacitor power dissipation
27.	IC Iq Pd	6.82 mW	Power	IC Iq Pd
28.	IC Pd	868.446 mW	Power	IC power dissipation
29.	L Pd	100.752 mW	Power	Inductor power dissipation
30.	Total Pd	970.866 mW	Power	Total Power Dissipation
31.	Vout Tolerance	2.732 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	22.0	Maximum input voltage
3.	VinMin	10.9	Minimum input voltage
4.	Vout	2.0	Output Voltage
5.	base_pn	TPS54335A	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54335A** Product Folder : http://www.ti.com/product/TPS54335A : contains the data sheet and other resources.